Exercise Solutions for Math 20

Lines and Circles

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1.1 Find the value of k such that the lines with equations $3x + 2y - 4 = 0$ and $kx - 3y + 8$ are:

1.1.a Parallel.

$\Rightarrow 2y = -3x + 4$ $\Rightarrow y = -\frac{3}{2}x + 4$	Rewrite the first equation in slope-intercept form.
$\Rightarrow -3y = -kx - 8$ $\Rightarrow 3y = kx + 8$ $\Rightarrow y = \frac{k}{3}x + \frac{8}{3}$	Rewrite the second equation in slope-intercept form.
$\Rightarrow \frac{k}{3} = -\frac{3}{2}$	Parallel slopes are equal.
$\Rightarrow k = -\frac{9}{2}$	Final answer. ■

1.1.b Perpendicular.

$\Rightarrow \frac{k}{3} = -\frac{1}{-\frac{3}{2}}$ $\Rightarrow \frac{k}{3} = \frac{2}{3}$	Perpendicular slopes are the negative reciprocal of each other.
$\Rightarrow k = 2$	Final answer. ■